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(54) Friction clutch assembly.

(57) A friction clutch assembly has a cover (11) for fastening to a flywheel (12), a pressure plate (16) connected to the cover by drive straps (17) and a diaphragm spring (19) urging the pressure plate towards the flywheel to grip a driven plate (27). Clutch release is provided by a pushrod (32) and thrust plate (28).

The diaphragm spring is of the kind having an outer Belleville spring portion (23) and spring fingers (24) but contrary to normal practice the fingers apply the load to the pressure plate. This allows the use of a cover adapted from a conventional cover and conventional mounting means (rivets 21) for the diaphragm spring.

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"Friction Clutch Assembly"

The invention relates to friction clutch assemblies of the kind comprising a cover for fastening to a flywheel, a pressure plate drivingly connected to the cover and a diaphragm spring acting between the cover and the pressure plate to urge the pressure plate towards the flywheel and, in use, to grip a driven plate interposed between the flywheel and the pressure plate, the pressure plate having means for receiving a release load which acts in opposition to the load of the diaphragm spring to move the pressure plate away from the flywheel to release the driven plate.

Such a clutch assembly is suited to engine and gearbox arrangements in which a pushrod for clutch release extends through the gearbox input shaft. However, when such an arrangement is used in relatively small numbers, for motorcycles for example, those parts which require expensive tooling for their manufacture are in themselves expensive because the tooling costs cannot be spread out sufficiently.

The present invention provides a friction clutch assembly of the kind described in which the diaphragm spring is of the kind comprising an outer Belleville spring portion and spring fingers which project radially inwards from said Belleville portion, the diaphragm spring applying its load to the pressure plate adjacent to the radially inner ends of the spring fingers and reacting its load onto the cover adjacent to the radially inner margin of the Belleville spring portion. This facilitates the use of a diaphragm spring of a conventional type which can, but for a reduction in the length of the spring fingers, be nearly identical with other springs used in large numbers in other clutches.

Conveniently the cover has mounting means adjacent to a central aperture for attachment to an input shaft, for example an engine crankshaft. This arrangement allows the use of a pressed cover which is common to pressed covers used for conventional diaphragm spring clutches for many of the press operations. Furthermore, the arrangement allows the connecting parts of the diaphragm spring to the cover to be the same as those used for conventional diaphragm spring clutches.

One embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:-

Fig. 1 is a cross-section of a clutch assembly according to the invention; and

Fig. 2 is an elevation of a diaphragm spring shown in Fig. 1.

Referring to the drawings, a friction clutch assembly includes a cover 11 which is fastened to a flywheel 12 by means of setscrews and captive nuts. The cover 11 has a central aperture which is spigotted to an engine crankshaft 13. Mounting means in the form of an inner peripheral flange 14 on the cover 11 adjacent to the central aperture allow the cover to be attached to the crankshaft 13 by setscrews 15.

A pressure plate 16 is drivingly connected to the cover 11 by three tangential straps 17 riveted to lugs 18 on the pressure plate and to outer flange portions of the cover. A diaphragm spring 19 urges the pressure plate towards the flywheel 12, being located on the cover 11 by six circumferentially spaced rivets 21 and a wire fulcrum ring 22. The diaphragm spring 19 is of the kind having an outer Belleville spring portion 23 and spring fingers 24 which project radially inwards from the Belleville portion.

The load of the diaphragm spring 19 is applied to a circular fulcrum rib 25 on the pressure plate adjacent to the radially inner ends of the spring fingers 24 and is reacted onto an interrupted circular fulcrum rib 26 pressed into the cover 11 adjacent to the radially inner margin of the Belleville spring portion 23.

A driven plate 27 is interposed between the flywheel 12 and the pressure plate 16 and is clamped by the load of the diaphragm spring 19. The pressure plate 16 has a central aperture including a recess in which a thrust plate 28 is releasibly retained by a circlip 29. A depression 31 in the centre of the thrust plate 28 is for receiving the end of a pushrod 32 which in the intended application passes through a gearbox input shaft 33 which is driven by the driven plate 27.

A thrust applied to the thrust plate 28 by the pushrod 32 pushes the pressure plate 16 away from the flywheel 12 against the load of the diaphragm spring 19 to release the driven plate 27.

The cover 11, diaphragm spring 19 and pressure plate 16 are assembled together and can be fitted to the crankshaft 13 as a complete assembly, allowing the thrust plate 28 and its retaining circlip 29, the driven plate 27 and the flywheel 12

to be fitted subsequently.

The cover pressing 11 is conveniently similar to one used for conventional diaphragm spring clutches in which the flywheel is bolted to the engine crankshaft and the diaphragm spring acts on the cover adjacent to the radially outer margin of the Belleville spring portion. In such clutches a release bearing acts on the spring fingers adjacent to their radially inner ends and the cover pressing has a large central aperture to provide clearance around the bearing. Thus the same press tools can be used in most of the cover forming operations, except those directly associated with punching out the central aperture.

Similarly, the diaphragm spring 19 can be substantially identical to that used in the conventional clutch, except that the spring fingers 24 are clipped so that they do not extend as far radially inwardly as in the conventional clutch. This gives similar economies of tooling.

Claims

1. A friction clutch assembly comprising a cover (11) for fastening to a flywheel (12), a pressure plate (16) drivingly connected to the cover and a diaphragm spring (19) acting between the cover and the pressure plate to urge the pressure plate towards the flywheel and, in use, to grip a driven plate (27) interposed between the flywheel and the pressure plate, the pressure plate having thrust receiving means (28) for receiving a release load which acts in opposition to the load of the diaphragm spring to move the pressure plate away from the flywheel to release the driven plate, characterised in that the diaphragm spring (19) is of the kind comprising an outer Belleville spring portion (23) and spring fingers (24) which project radially inwards from said Belleville portion, the diaphragm spring applying its load to the pressure plate (16) adjacent to the radially inner ends of the spring fingers and reacting its load onto the cover (11) adjacent to the radially inner margin of the Belleville spring portion.

2. A friction clutch assembly according to Claim 1, characterised in that the cover (11) has mounting means (14) adjacent to a central aperture for attachment to an input shaft (13).

3. A friction clutch assembly according to Claim 1 or Claim 2, characterised in that said thrust receiving means comprises a thrust plate (28) which is releasably retained in a central aperture in the pressure plate (16).

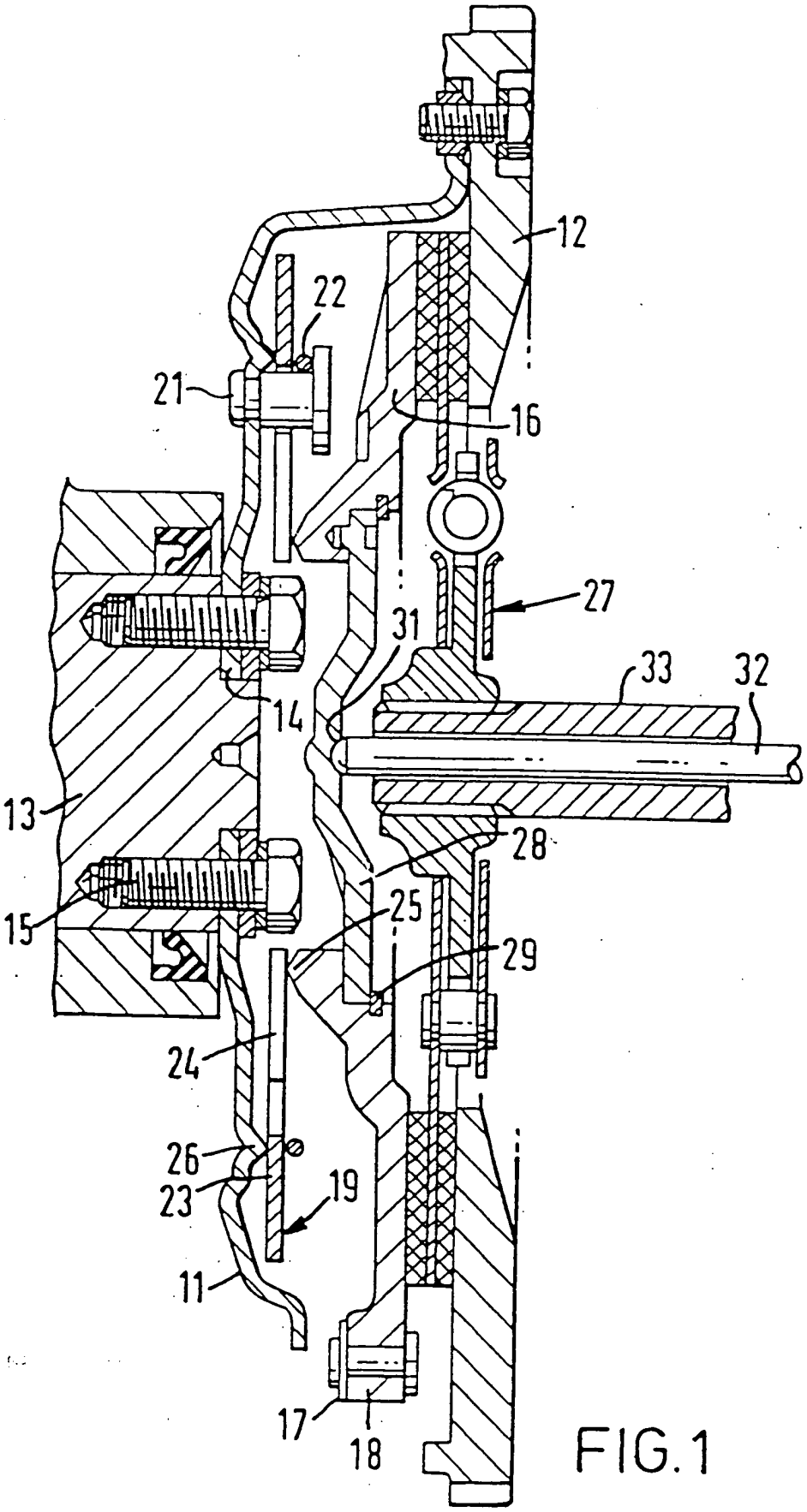

FIG.1

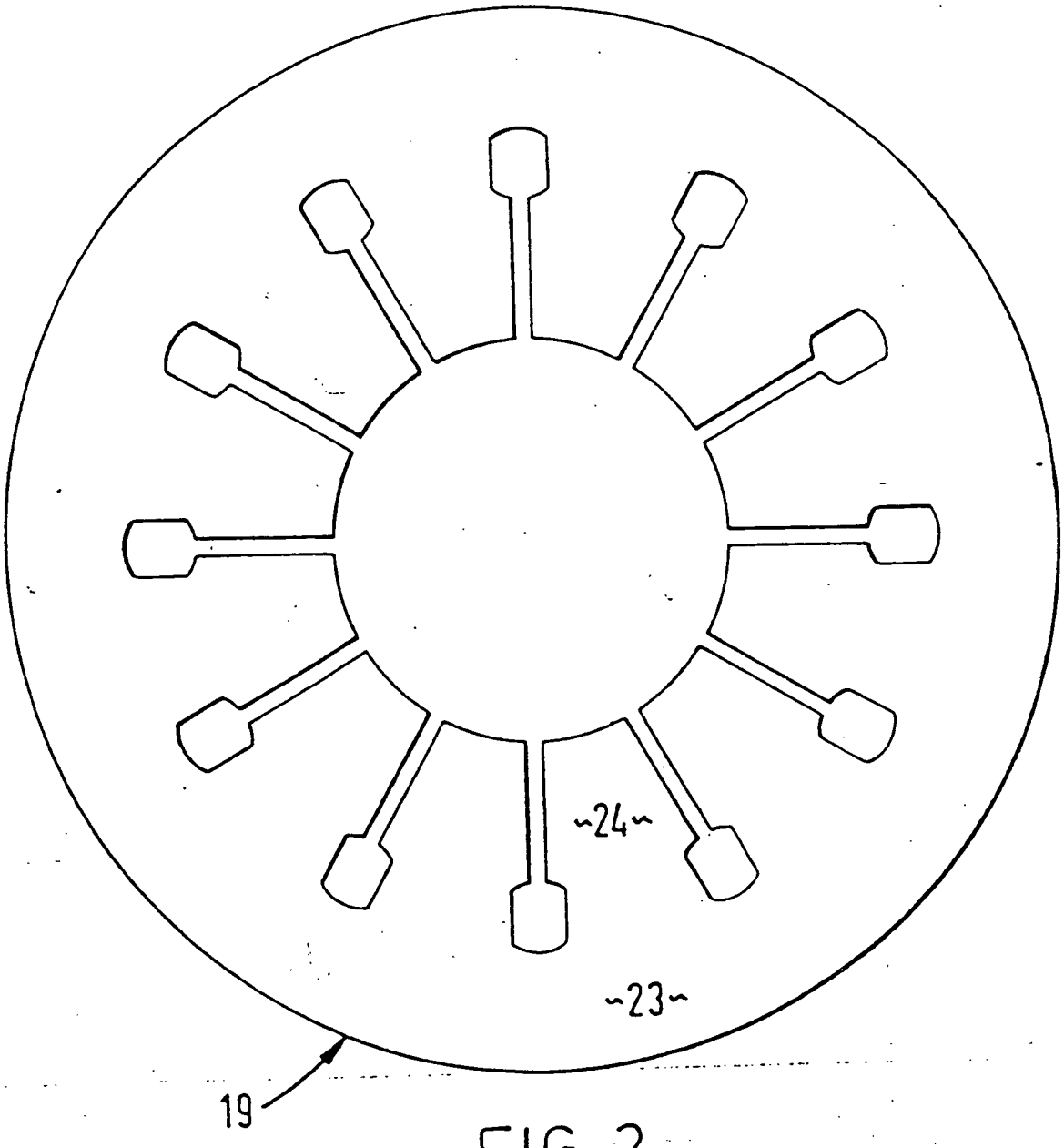

FIG. 2